



# UNITED STATES PATENT AND TRADEMARK OFFICE

9/04  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/823,196

03/30/2001

Thomas H. Baum

510

1232

25559

7590

11/01/2004

ATMI, INC.

7 COMMERCE DRIVE

DANBURY, CT 06810

EXAMINER

KIELIN, ERIK J

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 11/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/823,196

Applicant(s)

BAUM ET AL.

Examiner

Erik Kielin

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 8-12, 16, 37 and 87-91 is/are pending in the application.
- 4a) Of the above claim(s) 87-91 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-12, 16 and 37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 16 August 2004 has been entered.

### *Claim Rejections - 35 USC § 102*

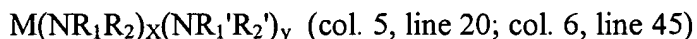
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 11, 12, and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,583,205 (**Rees, Jr.**).

Regarding claims 1 and 37, **Rees** discloses a CVD (chemical vapor deposition) precursor composition for forming a thin film dielectric on a substrate, including at least one metalloamide source reagent compound, or a vapor source reagent mixture including a metalloamide source reagent compound, having the formula



wherein M is a metal selected from Li, Zn, La, lanthanide and actinide series elements (called the "F-series"), (Abstract; col. 6, lines 27-30; col. 7, Table 1); N is nitrogen; each of R<sub>1</sub>,

Art Unit: 2813

R<sub>2</sub>, R'<sub>1</sub>, and R'<sub>2</sub> is the same or different and is independently selected from of alkyl, alkenyl, aryl, C<sub>1</sub>-C<sub>6</sub> alkyl, alkylsilyl (col. 4, lines 47-58); and x is from 1 to 5 and y and from 1 to 5 and x+y is the oxidation state of metal M. Each amino ligand, (NR<sub>1</sub>R<sub>2</sub>) and (NR'<sub>1</sub>R'<sub>2</sub>'), may be different because each of R<sub>1</sub>, R<sub>2</sub>, R'<sub>1</sub>, and R'<sub>2</sub> is the same or **different**. Also R<sub>1</sub> may be the same as R<sub>2</sub> and R'<sub>1</sub> may be the same as R'<sub>2</sub>, each of R<sub>1</sub>, R<sub>2</sub>, R'<sub>1</sub>, and R'<sub>2</sub> is the **same** or different. (See also col. 6, lines 6-56.)

Regarding claims 2 and 3, each of R<sub>1</sub>, R<sub>2</sub>, R'<sub>1</sub>, and R'<sub>2</sub> may be methyl or ethyl (col. 3, lines 24-43; col. 5, lines 1-28).

Regarding claims 11 and 12, the means by which the CVD precursor may be delivered to the CVD chamber is an intended method of using of the composition and does not have patentable weight in the instant claims drawn to composition. (See MPEP 2112.01 and 2112.02.)

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 8-10, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Rees** in view of US 6,159,855 (**Vaartstra**).

Regarding claims 8-10, **Rees** does not indicate the solvents for the CVD precursor.

**Vaartstra** teaches a CVD precursor composition comprising metalloamides wherein the solvents in which the metalloamide precursor are dissolved to form the CVD precursor are

Art Unit: 2813

disclosed at col. 8, lines 37-53. More specifically, ethers, amines, hydrocarbons (both aliphatic and aromatic) are disclosed. Further regarding claims 10, note that the C5-C10 aliphatic hydrocarbons are preferred and C8 is octane specifically.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use the solvents of **Vaartstra** as the solvents in the **Rees** CVD precursor composition, because **Vaartstra** teaches that metalloamides are soluble in such solvents for the purpose of CVD. Moreover, it has been held that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 1945) (Claims to a printing ink comprising a solvent having the vapor pressure characteristics of butyl carbitol so that the ink would not dry at room temperature but would dry quickly upon heating were held invalid over a reference teaching a printing ink made with a different solvent that was nonvolatile at room temperature but highly volatile when heated in view of an article which taught the desired boiling point and vapor pressure characteristics of a solvent for printing inks and a catalog teaching the boiling point and vapor pressure characteristics of butyl carbitol. "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig - saw puzzle." (65 USPQ at 301).

Regarding claim 16, the prior art of **Rees**, as explained above, discloses each of the claimed features except for indicating multiple metalloamide source reagent compounds.

**Vaartstra** teaches a CVD precursor composition comprising multiple metalloamide source reagent compounds. (See paragraph bridging cols. 6-7.)

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use multiple metalloamides in a CVD precursor of **Rees** to achieve a deposited layer having both metals, as taught to be beneficial in **Vaartstra**.

### *Response to Arguments*

5. Applicant's arguments filed 16 August 2004 have been fully considered but they are not persuasive.

Applicant argues that Rees does not provide sufficient specificity to anticipate the specifically claimed compounds, citing as support, *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.* and *In re Petering et al.* Examiner respectfully submits that this case law only provides support that Applicant is not entitled to the claimed compounds because Applicants --themselves-- have broadly disclosed and claimed a laundry list of metalloamides, **without** specificity. See for example the original claims 1 and 6, and the instant specification, section entitled, "Summary of the Invention" at page 14, first full paragraph. The instant specification and original claims wholly fail to discuss or recite any of the presently claimed compounds. Applicant cannot have it both ways, i.e. recite and claim broadly and then create --based upon the broadly recited general formula-- only a few compounds which allegedly avoid the prior art, as though the whole point of the instant invention was only those specific compound. This amounts to a hypocritical argument. For this reason, the argument is not found persuasive.

Applicant argues on p. 8 that Rees is not enabling for reciting too many compounds and therefore generating undue experimentation. Examiner respectfully disagrees. Rees is every bit

as enabling as is the instant specification for the claimed compounds, because the instant specification recites even more compounds than has Rees. Again, this is a hypocritical argument. It is unclear to Examiner how Applicant can suggest that they are entitled to broadly recite compounds and somehow provide enablement, but others are not allowed to do this.

Applicant's arguments regarding the rejection under 35 USC 103 are noted. The very fact that Applicant recognizes Rees uses a bubbler makes it clear that Rees is using a liquid to deliver the CVD precursors to the reaction chamber. Liquids come by either melting the solid precursor or dissolving it in a solvent. This is the only way a "bubbler" can operate.

Examiner respectfully disagrees that there is no motivation to combine the references. Inasmuch as Rees does not teach away from the use of a solvent and one of ordinary skill knows very well that solvents are used to enable delivery to the reactor in controlled concentration, one of ordinary skill would be motivated to use the solvents of Vaartstra in order to deliver the CVD precursors to the reaction chamber in controlled quantities without thermally decomposing the CVD precursors by otherwise melting them.

For all of these reasons the arguments are not found persuasive.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,015,917 (**Bhandari et al.**), a reference qualifying as prior art under 35 USC 102(b) and provided by Applicant in an IDS and assigned to the same assignee as the instant application

Art Unit: 2813

discloses Ta(NRR')<sub>5</sub>. Examiner notes with interest that this compound is presently claimed in withdrawn claims 87, 88, and 90.

US Patent Application Publication 2002/0197402 A1 (**Chiang** et al.) discloses “a series of gaseous compounds used for depositing semiconductors, insulators, metals or the like that are well-known in the art (e.g, PDEAT (pentakis(diethylamido)tantalum), PEMAT (pentakis(ethylmethyldamido)tantalum), ... TBTDET (t-butylimino tris(diethylamino) tantalum).” (See paragraph [0042].)

US Patent Application Publication 2002/0192952 A1 (**Itoh**) disclosed the same CVD precursors as Chiang. (See Itoh paragraph [0035].)

KR 2001-008502 A (**Ji** et al.) discloses the same compounds as does Chiang and Itoh. (See Ji, Abstract.)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 571-272-1693. The examiner can normally be reached on 9:00 - 19:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Erik Kielin  
Primary Examiner  
27 October 2004